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ABSTRACT

This newsletter, number 29 in this series, provides brief summaries of a broad range of recent activities, decisions, and publications related to science education in Britain and in many countries throughout the world. Beginning with a list of personnel having major responsibilities for science education under the reorganized British Council, the journal also provides the names and titles of science education specialists from 20 African and Asian nations who are working with the Council. Recent developments in England are reported; these include the 1976 meeting of the Association for Science Education, institution of new courses and degree programs, evaluations of existing programs, and new publications. Overseas activities of the Council are reported, and international meetings are described. An index for issues 19 through 28 of the Newsletter is included. (SD)

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THE BRITISH COUNCIL

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Science Education Newsletter

Number 29 January 1976

Issued by

Education and Science Division

SE020 664

SEN NO 29

CONTENTS

EDITORIAL

SCIENCE EDUCATION PERSONNEL IN LONDON AND IN OVERSEAS COUNTRIES

ACTIVITIES IN BRITAIN

1. Association for Science Education – Annual Meetings
2. Centre for Science Education, Chelsea College – New Diploma
3. Chemical Education in York
4. Reading University – Chemical Education
5. Southampton University – MSc (Ed) in Science Education
6. Environmental Education – New Diploma Course at Gwent College
7. Chester College – Liberal Studies in Science
8. Educational Use of Living Organisms (EULO)
9. Science 5 to 13 – A Formative Evaluation
10. Science for the Less Able Child
11. College Curriculum Science Studies Project
12. Mathematics Teacher Education Project
13. Chemical Society Education Division
14. Schools Technology
15. Computer Assisted Learning

16. PUBLICATIONS

OVERSEAS ACTIVITIES

17. Botswana, Lesotho and Swaziland
18. West Indies
19. India

INTERNATIONAL ACTIVITIES

20. Science and Mathematics Curriculum Projects Internationally 1956–1974
21. Directory of Science Teachers' Associations World Wide
22. International Council of Associations for Science Education (ICASE) – General Assembly
23. UNESCO – New Trends in Chemistry Teaching
24. International Union of Pure and Applied Chemistry – Atomic Weights
25. CASME Seminar, Ghana
26. School Mathematics Project European Seminar
27. Asian Regional Conference on Development of Integrated Curriculum in Mathematics
28. International Mathematical Olympiad, 1975
29. International World of Computer Education
30. Eighteenth London International Youth Science Fortnight, 1976
31. International Youth Federation for Environmental Studies and Conservation

32 INDEX

Cumulative index for issues 19–28

SCIENCE EDUCATION PERSONNEL IN LONDON

This edition of Science Education Newsletter is the first to be issued since the reorganisation, on October 10 1975, of the Education and Science Division of the British Council.

The reorganised Division has the following Departments:

Higher Education and Science	Director: Mr C N Horton
Media	Director: Mr T Singleton
Schools and Further Education	Director: Dr J Barrott

The whole Division is located at 10 Spring Gardens, London SW1, with the exception of Media Department, which is at Tavistock House, Tavistock Square, London WC1.

Schools and Further Education Department is subdivided into the following units:

Further Education Unit	Head: Mr D R Howell
Schools and Teacher Education Unit	Head: Mr G C Culling
Science and Mathematics Education Unit	Head: Mr D G Chisman

Science and Mathematics Education Unit is responsible for coordination of the Council's work in Science and Mathematics education at school level, and in science teacher education, and provides advisory and information services in these fields.

The present staff of the Science and Mathematics Education Unit are:

Mr Dennis Chisman:	Head, SMEU
Mrs Julia Nightingale:	Assistant
Miss Hilary Suffern:	Education Officer (Biological Sciences)
Miss Daphne Titheridge:	Information Officer
Mr Frank Watson:	Education Officer (ACTS)
Mr Bryan Wilson:	Education Officer (Mathematics)

SCIENCE EDUCATION PERSONNEL IN OVERSEAS COUNTRIES

The British Council is active in science education overseas in many ways, and one of the most important is in the personnel specially recruited to work "in the field". A small number of the people operate from British Council offices, and these are in the first list below.

A much greater number are recruited under Aid to Commonwealth Teaching of Science (ACTS) Scheme (see SEN 21.2), and these are very often closely involved with curriculum development or in-service training projects run by the host government. The ACTS officers are given in the second list below.

There are, in addition, many Officers, who are scientifically qualified, in posts as Representatives, Assistant Representatives or Science Officers overseas whose names are not listed here, but who are involved from time to time in science education work.

1. Science Education Specialists working for British Council Offices

INDIA	Assistant Education Adviser, (Science), Delhi	Dr J F BURTON
	Science Education Officer, Delhi	Mrs U BAJPAI
	Science Education Officer, Bombay	M NAIK
	Science Education Officer, Madras	G M JOHN
INDONESIA	Science Education Officer, Djakarta	B YOUNG
KENYA	Science Education Officer, Nairobi	S MOSS
MALAYSIA	Science Education Officer, Kuala Lumpur	A D BATES
NIGERIA	Assistant Representative (Science), Lagos	A E ASHWORTH
	Assistant Director (Science), Ibadan	J M S WHITTELL
	Assistant Director (Science), Kaduna	M B ATKINSON
PAKISTAN	Assistant Representative	J L DOBSON

2. ACTS Officers

Country	Post	Officer
BARBADOS	Consultant, Caribbean Regional Science Project University of West Indies, Cave Hill	C M LANCASTER
BOTSWANA	Education Officer (Inspector) Maths Ministry of Education, Gaborone	M MACRAE
	Science Curriculum Development Officer Ministry of Education, Gaborone	D C SANDERS
JAMAICA	Consultant, Science Education Centre University of West Indies, Kingston	P OKERA
KENYA	Senior Curriculum Specialist (Maths) Institute of Education, Nairobi	R ALLPRESS
LESOTHO	Maths/Science Advisory Officer National Teacher Training College, Maseru	A HERRIOT
MALAWI	Senior Lecturer (Primary Science) Lilongwe Teachers College	Dr W S RICHARDS
	Senior Lecturer (Biology) University of Malawi, Zomba	Miss H M MEREDITH
MALAYSIA	Education Officer (Secondary Science) Ministry of Education, Kuala Lumpur	E L BECKETT
	Education Officer (Secondary Maths) Ministry of Education, Kuala Lumpur	E D BICKNELL
MALTA	Adviser on Science Teaching Ministry of Education, Valetta	Dr C E FITCHES
MAURITIUS	Specialist in the teaching of Science Institute of Education, Reduit	B T CHADWICK
NIGERIA	Senior Lecturer (Maths Education) University of Ibadan	Dr W M HAWTHORNE
	Lecturer in Education (General Science) University of Ife	P A WHITTLE
	Lecturer (Primary Science Education) Ahmadu Bello University, Zaria	J REEVES
SIERRA LEONE	Curriculum Revision Officer (Secondary Science) University of Sierra Leone, Fourah Bay	B NICHOLL
SRI LANKA	Consultant in Science Education Ministry of Education, Colombo	J M BOWLES
	Adviser in Mathematics Ministry of Education, Colombo	M J BATTY
SWAZILAND	Head, Science Department William Pitcher Teachers Training College, Manzini	D SLIMMING
ZAMBIA	Senior Adviser in Science Education (Primary Science) Ministry of Education, Lusaka	P M H DAVIS
	Lecturer in Maths University of Zambia, Lusaka	G P THOMPSON

ACTIVITIES IN BRITAIN

1. ASSOCIATION FOR SCIENCE EDUCATION

1.1 Annual Meeting, Oxford, 2–6 January 1976

This meeting, which is held annually and brings together science teachers and educationists was held at Oxford for the first time since 1922. About 1800 attended of whom approximately 10% were from overseas. The conference took place from 2–6 January and it was the first time it had been held so as to include a week-end and to avoid participants being away from home on New Year's Day. .

As usual the British Council was responsible for a symposium on overseas education, an exhibition on the same subject and a reception for overseas participants. The reception was held at Rhodes House on the Friday, the first day of the conference; it was very fully attended and many old acquaintances re-established contact. The symposium was only-too-well attended in that there was not enough seating for all those who wished to take part. The theme was "The Role of Curriculum Development Centres in Science Education" and five distinguished speakers from Kenya, Yugoslavia, Korea, the USA and the UK led discussions and answered questions. The symposium lasted the whole of Saturday, the second day of the conference. The exhibition was intended to support the subject of the symposium and exhibits had been received from many of the countries in which the British Council works. This year the exhibition was well sited near the main conference centre.

People attending the conference were accommodated in some of the colleges of the University and experienced typical aspects of undergraduate life such as meals in hall and hospitality by college fellows. Most people were accommodated in Wadham, Trinity and New Colleges, fairly near the new departments of Zoology and Experimental Psychology in South Parks Road where the conference was held. A few were in Christ Church, some distance away, but no doubt compensated for by the superb surroundings of Christ Church Meadow and the river.

The University held a reception for members in St John's and Merton Colleges on the Sunday, and the Association had its annual Members' Reception in the Examination Schools on the Friday evening; the latter included dancing to suit all tastes.

Lord Bullock gave the Presidential Address on the subject "Science: a Tarnished Image?" in the Sheldonian Theatre on the Saturday and the full text of his address will appear in the next issue of the School Science Review.

As usual there was a wide variety of lectures, discussions and seminars as all levels of science education as well as on science itself. They included "Black Holes" by Dr D W SCIAMA, "Inorganic Chemistry and Life" by Professor R J P WILLIAMS and "Chemistry at School and University" by Dr E B SMITH. In addition there were workshops run by the University science departments and by manufacturers at which participants could learn new techniques; exhibitions of apparatus and experiments by manufacturers and members; and visits to local places of interest such as the Atomic Energy Research Centre, Harwell, British Leyland Motor Corporation at Cowley, and Blenheim Palace.

The conference was attended by several British Council officers from the UK and overseas and it concluded with the Association Dinner on Monday 5th January, at which the retiring Chairman of the ASE, Mr Andrew Bishop, handed over to his successor, Dr W J Kirkham, Science Adviser for Leicestershire.

1.2 Association for Science Education – Annual Meeting 1977

This will be held at the University of Leicester from Monday 3rd – Thursday 6th January 1977.

Further information will be available from the Annual Meeting Secretary, ASE Headquarters, College Lane, Hatfield, Herts.

2. CENTRE FOR SCIENCE EDUCATION, CHELSEA COLLEGE – A NEW DIPLOMA IN SCIENCE OR MATHEMATICS EDUCATION

A new one year Diploma in Science or Mathematics Education has been established at the Centre for Science Education, Chelsea College, University of London. The Diploma is designed specifically for overseas students and the first intake will be admitted in September 1976. The course will introduce students to the current educational system in the United Kingdom and to recent developments in the teaching of mathematics or one of the sciences at secondary school level. An element of comparative education, including reference to science or mathematics education, will also be introduced.

Entry Requirements

The Diploma course is normally open to overseas students who

1. have a first degree in science or mathematics

AND 2. **either** (a) have obtained the Graduate Certificate in education or its equivalent,

or (b) have at least three years teaching experience.

or (c) have at least three years experience in education other than as a teacher, judged appropriate by the University.

In exceptional cases students who do not meet these requirements may be accepted.

Programme

Students will take three courses:

a. **The Social Context and Organisation of Education in the United Kingdom**

A study of the United Kingdom educational system, its roots and development, with emphasis on those sociological, historical and philosophical issues which have a bearing on current practice.

b. **Theory and practice of teaching (with special reference to the teaching of mathematics or of one of the sciences)**

Curriculum design and implementation with particular reference to British projects and to modern methods of teaching. Aspects of relevant psychology.

c. **Education in countries other than the United Kingdom**

A range of educational problems in countries other than the United Kingdom including comparative questions related to the economics and administration of education and to the comparative position and development of science and mathematics education.

Further information may be obtained from:

Dr John Harris
Centre for Science Education
Bridges Place
London SW6 4HR

3. CHEMICAL EDUCATION IN YORK

A Course for Teachers in Chemistry and Chemical Education

(This article was contributed by J N Lazonby and D J Waddington, University of York, UK, from whom further information may be obtained.)

In times when both the content and methodology of chemistry teaching are changing rapidly, effective in-service courses for school and college teachers become all the more necessary. As well as up-dating knowledge, in-service courses must provide a stimulus for the exchange of ideas between teachers; in addition, they can be used to promote a field of research of direct interest and relevance to the teacher's own work.

However, considerable difficulties often face teachers wishing to attend a course; funds are required to support both himself and a temporary replacement at his school or college. We have attempted to minimise these problems at the University of York by running a course, organised by the Department of Chemistry and Education, comprising two parts. Part I consists of a twelve-week residential course, whilst Part II is carried out at his normal place of work (the equivalent of two terms work spread over twenty-one months). Those participants who satisfactorily complete both parts are awarded a higher degree (B.Phil) but others may only wish to take Part I which is self-contained.

Part I is divided into a series of core topics in chemistry (energetics, kinetics and mechanism of chemical reactions, molecular structure and its determination), firmly based on work in modern school and college syllabuses, and in chemical education (assessment and statistical procedures, educational research, administration of science departments). In order to enable participants to adjust the balance between chemistry and chemical education, there is a system of options which make it possible to devote any proportion of the time, between 50 and 75%, to chemistry. The options in chemistry include economic and technological aspects of chemistry, biochemistry and computers in chemistry – topics which are coming into new syllabuses; options in chemical education are concerned mainly with recent curriculum development projects, particularly those initiated by the Schools Council and the Nuffield Foundation.

There is a strong tutorial system in which participants can discuss, individually, specific problems that arise in school teaching or during the course as well as a series of tutorials in which two or three participants discuss, with a member of staff, work associated with the topic being currently explored, in classes and with practicals.

Part II of the course, done in the participant's own school or college, is a research project in chemistry or chemical education. As in Part I, this provides a link between secondary and tertiary chemical education, in which teachers at University, schools and colleges can influence and be influenced by each other, which must surely work towards the benefit of chemistry courses at all levels.

The model of twelve weeks' full-time followed by twenty-one months' part-time study has distinct advantages over the more usual one-year full-time course. In particular, it enables teachers to be released more easily, and the project in Part II, which spans more than a full school year, is more easily and effectively time-tabled. No doubt, much the same problems are faced in other countries wishing to provide in-service courses and perhaps this model may provide some of the answers. We have had a number of teachers from overseas taking the one-term Part I course and also taking Parts I and II as a full-time course leading to the B.Phil higher degree. These teachers have provided a tremendous stimulus to the course, leading to a wider understanding of present-day problems and advances in chemical education.

4. READING UNIVERSITY – CHEMICAL EDUCATION

1. In SEN 21.10, mention was made of the MSc course in chemical education offered by Reading University. In addition to this 12 months course, the Department of Chemistry would welcome people to do research and/or development in chemical education; this may be for a short period, or may lead to a higher degree such as MPhil or PhD.

2. Anyone interested in the MSc course, or in undertaking research in chemical education at Reading should contact Dr Michael Hudson, Department of Chemistry, University of Reading, Whiteknights, Reading RG6 2AD, England.

5. SOUTHAMPTON UNIVERSITY – MSc (ED) DEGREE COURSES IN SCIENCE EDUCATION

In September 1976, the University of Southampton is introducing three one-year, full-time courses in Biological, Chemical and Physics Education. The courses are offered jointly by the Department of Education, and the Departments of Biology and Physiology, Biochemistry, Chemistry and Physics.

Applications are invited from experienced teachers and lecturers, who will have the opportunity to study selected aspects of Biology, Chemistry or Physics, Science Curriculum Development, and related aspects of education. Examination is by the assessment of course work and a dissertation.

Further particulars are obtainable from Mr R Douch, Department of Education, The University, Southampton SO9 5NH.

6. NEW DIPLOMA COURSE AT GWENT COLLEGE

Gwent College of Higher Education has introduced a one year course leading to a Diploma in Environmental Studies awarded by the University of Wales.

The Principal of Gwent College is Mr Melville Harris, who was formerly the Director of the Schools Council project on "Environmental Studies 5 – 13".

The following is an extract from the description of the course issued by the College:

> "The tutors use a multidisciplinary approach and look to a wholly integrated curriculum for the 5 – 13 age range. Environmental Education is viewed as a progression of skills, some which grow as the studies proceed and others, such as the basic skills of Mathematics and Language, which are part of programmes in their own right, but which are geared to fit the Environmental Education programme, as well as developing within the programme itself. Our view of integration means that we are considering Social Studies, Physical Science, Biology and Ecology, Geography, History, Art, Rural Science, Mathematics and Language in Environmental Education. Indeed the course is titled "Learning through the Environment". We are not concerned primarily with Curriculum Studies but with a practical course designed to meet the needs of practising teachers."

Fuller information can be obtained from the Registrar, Caerleon College of Education, Newport, Gwent NP6 1XJ.

Tuition costs, including board and residency are expected to be £1200 in 1976/77.

7. CHESTER COLLEGE – LIBERAL STUDIES IN SCIENCE

This new three-year course, which was introduced in September 1975, leads to the degree of B.Ed or, after a fourth year of study, to B.Ed Honours.

Liberal Studies in Science has been defined as "Science, considered from the economic, historical, philosophical and social viewpoints". At Chester the emphasis is on the social and historical aspects. The aim of the course is to advance understanding of the human activities which we call science and technology; students are led to a greater appreciation of the influence and limitations of scientists and scientific ideas.

To obtain a B.Ed degree, a student must complete nine modules within three years; each of the Liberal Studies courses listed below counts as one module. A student may subsequently proceed to a B.Ed Honours degree, and Liberal Studies in Science may be taken as the main subject in this fourth year.

The courses available are:
Foundation Science (for those with little scientific background), Science and Society, The Scientific Revolution, Human Ecology and Science Studies and the Development of Scientific Concepts.

Liberal Studies in Science equips a student to teach lower classes in a secondary school and in primary and middle schools and those following the Schools Council Integrated Science Project (SCISP).

Admission to degree courses at Chester College requires 2 passes at 'A' level, not necessarily in science subjects. Further details of Liberal Studies in Science, and other Courses, are obtainable from:

Mr D W G Hooper
Head of Science Department
Chester College
Cheyney Road
Chester CH1 4BJ, UK.

8. EDUCATIONAL USE OF LIVING ORGANISMS (EULO) (SEN 25.6 and 25.26)

The next Conference on the Educational Use of Living Organisms will be held in Seville, 19–23 April 1976. This time, the emphasis will be on practical workshop sessions, with lectures, on the following topics: behaviour, ecology, genetics and physiology.

Full details are available from:

John D Wray, ILEA Teachers' Centre
Zoological Gardens, Regents Park
London NW1 4RY.

9. SCIENCE 5 TO 13: A FORMATIVE EVALUATION BY WYNNE HARLEN, PUBLISHED BY MACMILLAN EDUCATION, 128 pp PRICE £4

Dr Wynne Harlen was appointed as evaluator of the Schools Council Project Science 5–13 throughout the period (1967–73) during which the project team was producing material; this book gives an account of her work.

Evaluation was an integral part of the development of the project, whose aim was to assist teachers to help children, through discovery methods, to gain experience and understanding of the environment and to develop their powers of thinking effectively about it. The units are designed, not as a course, but as a source of ideas and guidance which teachers can use in planning programmes of work fitted to the particular requirements of their class.

Dr Harlen stresses, as an important aspect of her work, that it was *formative*: ". . . it was felt beneficial – even if uncomfortable – to have someone in the team who had to ask needling questions". As a result, precisely defined objectives were drawn up; indeed, teachers were anxious that these should be made explicit in the material at every stage. 4 sets of trials of the units took place, and in the light of the evaluator's findings, a number of changes were made.

Dr Harlen's clear account of the problems, practicalities and the value of formative evaluation in the field of curriculum reform, will be most useful and illuminating to those involved in this area.

10. SCIENCE FOR THE LESS ABLE CHILD – A SCHOOLS COUNCIL PROJECT

1. A group of nine Birmingham teachers is producing science materials, based on their local urban environment, which will be suitable for non-academic secondary pupils, between the ages of 14–16. The aims of the undertaking are:-

1.1 to provide experiences which will enable the child to become knowledgeable and aware of himself, his environment and the community to which he belongs.

1.2 to produce resources to help the child to develop his knowledge and skills through suggested activities and the use of appropriate tools.

2. It is hoped that the following units will be produced:
   - 2.1 Introduction to project
   - 2.2 Structures
   - 2.3 Transport
   - 2.4 Machines
   - 2.5 Solution
   - 2.6 Safety
   - 2.7 Communications
   - 2.8 Parks, gardens and waste ground
   - 2.9 The Home
   - 2.10 Resources (This unit will include sources of supply, methods of construction of apparatus, bibliography and audio visual material).

3. The project will last from 1975 to 1977; trial versions of units will be tested on a sample group of some 800 children in 32 classes.

4. The coordinator of this project is F L Darrall, Birmingham, Science Mathematics Centre, St Lukes Road, Birmingham B5 7DA.

11. COLLEGE CURRICULUM SCIENCE STUDIES PROJECT (see SEN 20.8)

This project, started in 1971 and sponsored jointly by the Nuffield Foundation and the Social Science Research Council, has now produced its first published materials. (The organiser of the project, which is now based at Chelsea College, London, as part of the Nuffield Foundation Science Teaching Project, is Mr John Bird.)

The materials take the form of a series of modules, or small units of work. Each unit considers these five aspects of teaching and training teachers:

i. **Science** – science activities studied practically at the teacher's level before use in class.

ii. **Children** – observation of children's scientific activities and their responses to particular methods of teaching and class organisation.

iii. **Teachers** – consideration of the methods used by colleagues.

iv. **Resources** – a study of materials useful in the teaching of science.

v. **Discussion and thought** – a critical consideration of the "what", the "why" and the "how" of science teaching, on the basis of these experiences.

All the units reflect this five-fold pattern of experiences, although there are differences of emphasis, some laying more stress on particular science topics, others on teaching methods.

The modules, as they are published, will form a series entitled "Teaching Primary Science". Two have been published so far:

Candles
Seeds and Seedlings

Both are attractive books of about 40 pages, with plenty of photographs and diagrams and some examples of pupils' writings. Questions for special consideration and discussion occur throughout the books, and are shaded for emphasis.

"Candles" considers how to make a start on the topic, problems of organisation, the scientific approach (observation, explanation, is a particular experiment a fair test?) and ideas for further investigations based on the topic.

"Seeds and seedlings" has the same type of approach, but also considers the use of vocabulary, and the pros and cons of workcards.

Further titles, in preparation, are:

Science from water play
Fibres and fabrics
Science from wood
Aerial models
Paints and materials
Child generated science
Mirrors and magnifiers
Visit to a wood
Students, teachers and science: a lecturers' guide.

The books are published by Macdonald Educational, 49–50 Poland Street, London W1, price £1.50 each.

12. MATHEMATICS TEACHER EDUCATION PROJECT (SEN 27.11)

The initial writing stage of this project, mentioned in SEN 27, has now been completed. It is expected that the materials will be published by Blackie and Chambers, Edinburgh in 1977.

Further details are available from Mr G T Wain, Centre for Studies in Science Education, The University, Leeds LS2 9JT.

13. CHEMICAL SOCIETY EDUCATION DIVISION

The Chemical Society's Education Division is divided into 3 sub-groups: assessment, curriculum, and educational techniques. The assessment group has been involved in compiling a multiple choice question Bank and this now contains some 2,500 items. Sections of this Bank are available for sale on application to the Secretary of the group, Dr G M Seddon, School of Chemical Sciences, University of East Anglia, University Plain, Norwich. More than 18 institutions participated in the scheme for collecting this Bank of questions including several from overseas.

The assessment group is planning a symposium on profile assessment in science entitled 'Complete Assessment'. This will be held at the Slough College of Technology on 12 April 1976. Further details and registration forms can be obtained from Mr N A J Luff, Slough College of Technology, Wellington Street, Slough, Buckinghamshire.

The curriculum sub-group has been working on the collection of information about educational innovations in the polytechnics and has also been compiling a directory of current educational research in chemistry. The results of these surveys will be published in the curriculum group's newsletter which is distributed to all members of the sub-group.

The educational techniques sub-group is preparing a series of audio tapes and background notes for sale to students in institutions. The first 4 in this series are: 'Some Aspects of Electrolytic Solutions' by Professor G Hills; 'Heavy Metals as Contaminants of the Human Environment' by Professor Bryce-Smith; 'Electrophilic Aromatic Substitutions and Elimination Reactions' by Dr Peter Sykes; 'The Chemical Consequences of Molecular Symmetry' by Professor S Kettle. Further details about the sale of these tapes may be obtained from the Secretary to the Chemical Education Division: Miss Elaine Goodall, The Chemical Society, Burlington House, Piccadilly, London W1.

The Education Division has now available a number of publications arising from various symposia and special events during the last few years. These are as follows:

Chemical Education at the Tertiary Level: Swansea 1971, 50p

The Role and Nature of Experimental Work in Chemistry Courses: Nottingham 1972, 50p (£1.00)

The Discipline of Chemistry — Its Place in Education: Swansea 1973, £1.00 (£2.00)

Chemical Education in Industry: Norwich 1973, 75p (£1.50)

Alternatives to the Lecture in Chemistry: Norwich 1973, 75p (£1.00)

The Communication of Chemistry: London 1974, 75p (£1.50)

Objective Testing — A Workshop Report, 1974, £1.00 (£2.00)

Survey of Chemistry Teaching at University Level. Published by IUPAC Committee on the Teaching of Chemistry and UNESCO, 1972 50p (£1.00)

Catalogue of Unpublished Teaching Resource Material in Chemistry, 1974, £1.00 (£1.50)

Independent Learning in Tertiary Science Education: London 1975, £1.00 (£2.00)

Problems of Innovation: York 1975

Educational Techniques in the Teaching of Chemistry: Guildford 1975.

The price in brackets is for those who are not members of the Division. The last two items have still to be published and the price is not yet known.

The Annual Chemical Congress of the Chemical Society which is to be held in Glasgow from 5–9 April 1976 will contain a number of symposia among which is one organised by the Education Division on 'The Development of Social and Economic Awareness of Chemistry'. Further details about the Chemical Congress can be obtained from Dr J Gibson at the Chemical Society, Burlington House, Piccadilly, London W1.

14. SCHOOLS TECHNOLOGY

A Directory of Resource Material for Teachers of Technology in Schools has been compiled by Dr C Pratt, formerly head of engineering science at Bosworth School, Leicestershire, now a lecturer in the Department of Civil & Structural Engineering at Trent Polytechnic. It has been published by the National Centre for School Technology in collaboration with the standing conference on schools science and technology which is developing a comprehensive data bank for school technology of which this is a part. Copies may be obtained from the National Centre for

School Technology, Trent Polytechnic, Burton Street, Nottingham, price 25p each (cash with orders only, with cheques payable to Nottinghamshire County Council).

The journal 'School Technology' is a nation-wide forum for the exchange of ideas on how schools can help boys and girls become aware of the technological forces in society and become involved in the processes of technology itself. It appears 4 times a year (September, December, March and June) and the annual subscription is £2.50.

15. COMPUTER ASSISTED LEARNING

A National Development Programme has been under way for 2½ years to develop and encourage the use of computer assisted learning. The cost of this experimental programme is in the order of £2m of which half is devoted to the post-secondary sector (mainly university) with a further £300,000 for schools, £160,000 for military and smaller amounts for industrial training and for investigation into the transferability of software etc.

Computer assisted learning is defined simply as any use of the computer in teaching or learning. It is usual however to distinguish between the use of the computer for individualised instruction – a tutorial use – and the use of the computer in problem solving models – a simulation use – and the use of the computer for computer-managed learning – ie of direct assistance to the teacher/tutor.

The university programmes include a number in the field of science such as a computer assisted undergraduate studies in chemistry programme which is based on the University of Surrey and two of the University of London Colleges, and another programme in chemistry being coordinated by Dr Peter Ayscough of the University of East Anglia involving 9 universities and polytechnics in the tutorial use of the computer in physical chemistry. The computer assisted undergraduate studies in chemistry at the University of Surrey is based on the simulation approach (ie models for problem solving). None of the programmes being developed at the school level is in the field of science.

See also paragraph 16.3: "Computer Assisted Learning in the United Kingdom – Some Case Studies".

PUBLICATIONS

16.1 STUDIES IN SCIENCE EDUCATION, Volume 3 (see SEN 24, 18.5 and 27, 18.2)

The third edition of this annual review of research and critical issues in science education, edited by Professor David Layton of Leeds University, is now available. The contents are as follows:

Articles

J M Harding, Middlesex Polytechnic – The Study of Curriculum Change

P J Kelly, Chelsea College

R B Nicodemus, Open University

C A Tawney, University of East Anglia – Evaluation and Science Curriculum Projects in the UK

Peter Strevens, lately University of Essex – Problems of learning and teaching Science Through a Foreign Language

J R Hartley, University of Leeds – Computer Assisted Learning in the Sciences: Some Progress and Some Prospects.

Research Notes

Science Education research: some thoughts and observations – R F Kempa

The Training of Science Education Research Workers – P J Fensham

Theses and dissertations submitted for higher degrees, 1973–75

The Laboratory for School Science at the University of Oslo.

The volume will also contain book reviews.

Volume 3 is available, price £3.00 ($8.00) including postage, from The Business Manager, Studies in Science Education, Centre for Studies in Science Education, The University, Leeds LS2 9JT. Remittances from overseas should be in sterling where possible, and cheques etc should be crossed and made payable to The University of Leeds.

Copies of Volume 2 (1975) are still available, price £2.00 ($5.00).

16.2 SAFETY IN LABORATORIES – published by Ciba-Geigy

This 42-page booklet gives simple, direct instructions with entertaining sketches; it is hoped by the company that it will form the basis of a general code of practice for the safe operation of chemical and other processes in the laboratory.

The booklet is available from the Corporate Public Relations Department, Ciba-Geigy (UK) Ltd, Simonsway, Manchester M22 5LB.

16.3 COMPUTER ASSISTED LEARNING IN THE UNITED KINGDOM – SOME CASE STUDIES edited by Richard Hooper and Ingrid Toye, published for the National Development Programme in Computer Assisted Learning by the Council for Educational Technology for the UK

The book gives an impression of the state of the "art" of Computer assisted learning in the UK at the start of the National Development Programme in Computer Assisted Learning in 1973. Following a general introduction and overview, the book is divided into four parts. In Part I, computer assisted and managed learning in secondary education are described, in the following sections:

1. Computers as a resource for learning
2. Computer assisted learning in ICL
3. The Havering Computer Managed Learning System
4. Computers in School Timetabling
5. Computer Assisted Learning in Scottish Schools
6. Computer Activities at Tavistock School
7. Computer-produced audio-visual material

Part II examines higher education; Part III some applications to training; and Part IV briefly looks at the relationship between computer assisted learning and certain specialised research into artificial intelligence and cognitive psychology.

A case study approach has generally been adopted so that the reader will gain some detailed understanding of particular work as well as more general information; the book does not aim to be a comprehensive survey of all computer assisted learning in the UK in 1973/74.

Copies of the book are obtainable, price £3.75 each (exclusive of postage) from Councils and Education Press Ltd, 10 Queen Anne Street, London W1M 9LD.

16.4 'PUPILS' ATTITUDES TO SCIENCE: A REVIEW OF RESEARCH by M Ormerod and D Duckworth published by the National Foundation for Educational Research Publishing Company Limited, The Mere, Upton Park, Slough, Buckinghamshire.

This book contains an exhaustive documentation of research conducted mainly but not entirely within the English-speaking world and reviews the literature of pupils' attitudes towards science. The authors outline the influence on pupils' liking for science of practical work, discovery learning, coeducational and single sex schooling and the early age at which interest in science develops. In addition the effects of the child's background, his or her concepts of scientists and their work and anxieties about the possible undesirable implications of scientific and technological advance are discussed.

The book contains chapters on Attitude Measurement in Science Education, Differences Between Biology and the Physical Sciences, The Difficulty of the Physical Sciences and its Causes, The Early Age of Arousal of Science Interest, The Critical Role of the Science Teacher and The Feelings of Pupils and Students about the Social Implications of Science and the Activities of Scientists.

16.5 SCOTTISH CENTRE FOR MATHEMATICS, SCIENCE AND TECHNICAL EDUCATION, DUNDEE – MEMORANDA

Two more of these useful booklets have been issued:

Memorandum No. 19: Nature of Chemical Reaction

No. 20: Modern Mathematics and its implications for Physics teaching.

The latter emphasises the need to identify and eliminate differences in notation, terminology and language, in timing and in presentation of mathematical material, between the approaches of physics and mathematics teachers.

These, and earlier memoranda, are obtainable from the Centre, price 25p per copy (including postage and packing within the UK). Cheques should be made payable to "Dundee College of Education", and orders addressed to the Centre, College of Education, Gardyne Road, Broughty Ferry, Dundee.

16.6 NEW BIOLOGY FOR WEST AFRICAN SCHOOLS – R H Stone and A B Cozens, published by Longman, 1975, price £2.20

This is an edition of the well-known "New Biology for Tropical Schools", specifically dealing with the flora and fauna of West Africa, and with health, environmental and agricultural issues in that area. It has been prepared by the authors, with the advice of F I Emina of Edo College, Benin, and F O C Ndu of Alvan Ikoku College of Education, Owerri.

The approach and format of this edition are similar to those of the original book, but there are some important changes. Practical ecology, microbes and man, productivity and agriculture, crops, variation in man, first aid, and modes of nutrition are some of the new introductions, while chapters on the anatomy and physiology of non-mammals have been curtailed.

Photographs and illustrations are copious and well-chosen; the book includes questions from WAEC, Cambridge and London boards, related to the work of each chapter.

Doubtless teachers of biology in West Africa will find this new adapted volume even more useful than its predecessor.

OVERSEAS ACTIVITIES

17. BOTSWANA, LESOTHO AND SWAZILAND

Mathematics Workcards

A recent issue of "Mathematics in Schools" (dated November 1975) includes a description by Ken Lewis of the Faculty of Education, University of Botswana, Lesotho and Swaziland of the successful introduction of locally-produced workcards into the teaching of mathematics in these 3 countries.

The story goes back to 1968, when it was decided to adopt the School Mathematics Project (SMP) approach to Mathematics in Botswana, Lesotho and Swaziland. In 1971, teams of teachers in the 3 countries, coordinated by Ken Lewis, started to adopt SMP materials for form 3 and 4 of secondary school, and these are now in general use as "BOLESWA Books E and F".

It was felt that a new approach for the first 2 years of secondary school was also needed, and in 1973 it was decided to adopt the SMP workcards. These would have 3 advantages:

i. in coping with the problem of mixed ability classes

ii. in overcoming the lack of teacher continuity

iii. in giving teachers the opportunity to become involved in curriculum development by the writing of suitable *local* material.

Help was given to the project by CEDO until 1974, and now by the British Council and by UNESCO.

In 1974, 12 schools started trials of the first workcards. When pupils' progress was evaluated, it was found that their mastery of the course content was very slightly better than that of pupils taught in the traditional manner. However, their enthusiasm and their ability to use their knowledge in new situations were significantly better. It was therefore decided to continue the project, and trials of cards for the second year started in January 1975. Much writing has been done by the teachers, ranging from small alterations to existing cards, to new or completely rewritten topics.

Recently it has been decided to continue individualised work into year 3, the public examination year for the Junior Certificate. Boleswa Book E will be retained, but study guides will be produced for each chapter.

It will be of great interest to see the impact of these promising developments on the Junior Certificate at the end of 1977; if they prove successful, then the project faces the task of spreading the scheme to a larger proportion of secondary schools in Botswana, Lesotho and Swaziland, by increasing teachers' familiarity with the materials.

To this end, 3 film-strip sequences with tape-recorded commentaries, produced by the British Council, will be available in early 1976. They are for use in pre- and in-service teacher training courses, and look at the problems and solutions of classroom management implied by the use of an individualised, workcard-based learning system.

18. WEST INDIES

WISC (West Indies Science Curriculum) News

The first two editions of this newsletter were issued in March and July 1975, and future newsletters will appear every few months. The aim of WISC News is to enable all teachers of WISC in schools in the Caribbean to keep in contact with each other, and to communicate ideas developed in one island or school to others. The newsletter will also be distributed to science teachers in non-WISC schools in order to encourage them to take up the course.

The first edition includes articles on examinations, ecology in WISC, teaching the less academic pupil, and the role of the WISC coordinator. The second edition concentrates on aspects of improvisation using local resources — building apparatus, modifying work units and exploring the environment. These problems were discussed and tackled at a workshop for Science teachers in St Lucia, in May 1975.

The address of WISC News is: P O Box 64
School of Education
Bridgetown, BARBADOS

19. INDIA

19.1 Bombay Science Education Newsletter (BSEN)

This newsletter, produced by the British Council Division of the British High Commission, has now reached its fifth year of publication. Since 1971 its circulation has grown to over 1000, and its scope has widened to cover developments in other parts of India and abroad.

Issue No 36, dated July 1975, includes the following reports:

19.2 **Maharashtra State Teacher Education Seminar, 17 March – 4 April 1975**
This three-week seminar on Teacher Education, the first of its kind in India, was organised at the State Institute of Education, Pune. 32 teacher educators participated with great enthusiasm in the seminar, which was conducted by Mr George Culling (British Council's Schools and Teacher Education Unit), Professor Jack Duthie (University of Stirling) Mr Roy Harris (Digby Stuart College, London) and Mr Jom Harman (British Council Division, Bombay). The seminar dealt with the techniques of micro-teaching, interaction analysis and simulation. Participants were obviously keen to follow up the techniques of micro-teaching in their own colleges after the seminar.

19.3 **Modern Mathematics Course**
Miss Edith Biggs conducted a workshop in modern mathematics for primary school teachers in Bombay in January and February 1975. This concentrated on three main aspects – measurement, number and shapes, and in particular on structure and patterns. The workshop was split into two parts, with a gap of three weeks. In the first part, the teachers used the new ideas to plan activities for use with their own classes in their own schools; they returned for the second part of the workshop able to discuss their successes and failures, and to learn from them.

19.4 **Goregaon School – College Complex (Teachers' Centre) Bombay**
This Complex, based at Patkar College of Arts and Science, Goregaon, was formally inaugurated in July 1975. It has been formed through the collaboration of 25 high schools and Patkar College, and the efforts of Dr R A Kulkarni, the Vice-Principal of the College and Secretary of the Complex.

The Centre is already active, providing a library for teachers, and facilities for seminars and meetings. The plans for its first year include enrichment programmes for gifted children, Nuffield Secondary Science workshop, apparatus workshops, science orientation programmes for Higher Secondary teachers, film shows, and an inter-school Science Exhibition.

INTERNATIONAL ACTIVITIES

20. SCIENCE AND MATHEMATICS CURRICULUM PROJECTS INTERNATIONALLY, 1956–1974: The Ninth Report of the International Clearing-House

This ninth report of the International Clearinghouse, Science Teaching Centre, University of Maryland, edited by Dr David Lockard, is now available. In 395 pages it summarises the important information about major science and mathematics curriculum developments in various parts of the world during the eighteen year period, 1956–1974. Basic information about each project is provided concisely by the use of keys; in addition each project director has furnished a short report highlighting the main accomplishments of that particular curricular project.

The report, together with the earlier Clearinghouse reports, provides a good review of a very important period in science and mathematics curriculum work.

Copies of the ninth report are available, price $5.00, (payable to the University of Maryland), from:
The International Clearinghouse, Science Teaching Centre, University of Maryland, College Park, Maryland 20742, USA. Copies of the **seventh** and **eighth** reports are still available, price $2.00 per copy, from the same address.

21. DIRECTORY OF SCIENCE TEACHERS ASSOCIATIONS WORLDWIDE

A completely new edition of the Directory of Science Teachers' Association Worldwide has been published on behalf of the International Council of Associations for Science Education (ICASE) by the ASE (UK).

The new edition contains details of 60 science teachers' associations the majority of which have supplied recent information to bring the Directory up to date.

Copies of the Directory have already been supplied to member associations of ICASE. Additional copies are available to individuals through their member associations at US $5 (£2.50) and to non-member associations or other individuals at US $10 (£5). These prices include postage and packing (surface mail) and a guarantee from the ASE to supply revision sheets periodically over the next two years by which time (in 1978) it is expected that a new Directory will be published.

Copies may be purchased directly from the ASE, College Lane, Hatfield, Herts, UK or from the British Council in London.

22. INTERNATIONAL COUNCIL OF ASSOCIATIONS FOR SCIENCE EDUCATION – General Assembly

The first full General Assembly of the International Council of Associations for Science Education (ICASE) since the Foundation meeting in Maryland in 1973 was held in December 1975 at Oxford immediately preceding the Annual Meeting of the ASE (see section 1).

The Assembly was attended by about 50 representatives of science teachers' associations and 20 observers. Most of the representatives and observers also attended the ASE meeting as guests of the ASE or of the British Council. Some of the representatives were also involved – as participants or as observers – in a UNESCO sponsored seminar on evaluation of integrated science held in Oxford in December (see SEN 28:23).

ICASE now has more than 30 member associations and associate members. A complete list of these will appear in the next issue of SEN.

The new Officers and Executive Committee for ICASE elected at the General Assembly are as follows:

President:	Mr B G PITRE (India)
Vice President:	Mr B G ATWOOD (UK)
Immediate Past President:	Dr J D LOCKARD (USA)
Executive Committee:	Mr JOHN KUSI-ACHAMPONG (Africa) Miss THERESIA PIETERSZ (Asia/Australia) Mr WORKLEY BRAITHWAITE (Caribbean) Mr J VAERNEWIJCK (Europe) Dr V SHOWALTER (N.America)
Coopted:	Mme J SOUCHON (France)
Editor:	Dr D COHEN (Australia)
Secretary/Treasurer:	Mr D G CHISMAN, British Council 10 Spring Gardens, London SW1A 2BN

23. UNESCO: NEW TRENDS IN CHEMISTRY TEACHING

Volume IV of the **New Trends in Chemistry Teaching** (Editor: Dr Peter Farago) has recently been published by the UNESCO Press, Paris. This volume is based on the working papers prepared for the International Congress on the Improvement of Chemical Education (Wroclaw, Poland, 1973) organised by UNESCO in collaboration with the IUPAC Committee on the Teaching of Chemistry. Available from UNESCO House, 7 Place de Fontenoy, 75700 Paris: 1975 pp 159: price ca US $5.

24. INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

Atomic Weight

The International Union of Pure and Applied Chemistry (IUPAC) Commettee on the Teaching of Chemistry, in consultation with the IUPAC Commission on Atomic Weights has prepared a "Table of Atomic Weights to Four Significant Figures". Copies of this authoritative table may be obtained from the IUPAC Secretariat, 2/3 Pound Way, Cowley Centre, Oxford, UK. It is also printed in the IUPAC International Newsletter on Chemical Education available from the same address or from the British Council, London.

"Atomic Weight" is the term used by chemists for "relative atomic mass". Since 1961 the internationally accepted values have been scaled relative to the isotope ^{12}C taken as 12 exactly. Atomic weights are therefore dimensionless numbers.

About 20 elements have only one isotope that occurs in nature and their atomic weights have been determined very precisely, frequently to better than one part in a million. However, most elements have more than one naturally occurring isotope and the variation in the relative abundance of these isotopes limits the precision with which the atomic weight of an element in nature can be quoted. For such elements the atomic weight is not a "constant of nature" but is best regarded as a property of the particular sample of that element being studied. For example, atomic weight values of lithium, boron, calcium, sulphur and strontium may differ from the atomic weights of samples in nature by more than one in the fourth significant figure, and other elements are known to vary to a lesser extent, for example, carbon (by about 1 in 10^4) and oxygen (by about 1 in 10^5).

It is also possible to separate the isotopes artificially: a good example is hydrogen which has two stable isotopes of relative atomic mass 1 007825 and 2.014102 respectively. It is therefore possible to have samples of hydrogen with atomic weights which vary between these two extremes, though naturally occurring hydrogen always has values close to 1.0079. The atomic weight values given in the Table do not apply to artificially separated isotopes and other samples which have been submitted to processes that appreciably change the isotopic composition of the elements.

In addition, many elements, including all those of atomic number greater than that of bismuth, are radioactive with isotopes which transform into other elements in the course of time. The atomic weight of a given sample of such an element depends on the relative rate at which its various isotopes decay and sometimes also on the radiogenic origin of the particular sample. For such elements it is not possible to quote an approximate atomic weight which is generally applicable even to four significant figures and so the atomic mass number of the isotope of longest known half-life is quoted in parentheses.

The atomic weights of the elements are reviewed every two years by the Commission on Atomic Weights of the International Union of Pure and Applied Chemistry. Their biennial reports should be consulted for further details and elaboration, the most recent report being Atomic Weights of the Elements 1973, which appeared in *Pure and Applied Chemistry* **37**, 589 (1974). However, it is unlikely that the values quoted to four significant figures will be altered by these revisions.

25. CASME SEMINAR, GHANA: "Language and the Teaching of Mathematics and Science with Special Reference to Africa"

The Commonwealth Association of Science and Mathematics Educators (CASME) was inaugurated in September 1974 (SEN 26.28). Its major aim is to assist science and mathematics educators within the Commonwealth to study the relationship of their work to the social and cultural conditions of the countries within which they are working. It is expected that CASME will convene occasional meetings in different regions of the Commonwealth, where various aspects of this relationship can be studied.

The first such regional meeting took place in Accra, Ghana, from 28–31 October, 1975. Participants were drawn from 10 countries of Commonwealth Africa, and in addition there were a small number of CASME Council members present, as well as representatives of the British Council and UNESCO. The seminar theme, "Language and the Teaching of Mathematics and Science with Special Reference to Africa", followed up a previous UNESCO-CEDO-ICMI symposium on "Interactions Between Linguistics and Mathematics Education", Nairobi, September 1974 (SEN 26.31). The CASME seminar attempted to develop the theme further, and to extend it to science education.

The seminar was opened by Professor N O Anim, Director-General of the Ghana Education Service. The bulk of the work was done through discussion, both in plenary and small group sessions. Among the major conclusions was the fact that, while vocabulary problems loom large in the language circumstances of practically every African country, the problems of language syntax pose comparatively few difficulties in the teaching of science and mathematics. Time was spent in considering the problems arising from a change in the language of education at some point in a student's school life, and it is hoped that the work of the Yoruba Project, based at the University of Ife, Nigeria, will throw further light on this. It was agreed that much more attention should be given in teacher education to the development of linguistic awareness in teachers of mathematics and science.

A report of the seminar will be available, probably about mid-1976, from the Commonwealth Secretariat, Marlborough House, Pall Mall, London SW1.

26. SCHOOL MATHEMATICS PROJECT EUROPEAN SEMINAR, 8–11 SEPTEMBER 1975

This was a unique gathering of key mathematics educationalists brought together, at the initiative of the British SMP, from various European countries and international bodies. It took place at the Schloss Leopoldskron, a conference centre in Salzburg, Austria.

There were participants from Austria, Belgium, Denmark, Britain, France, Holland, Italy, Luxembourg, Norway and Sweden, and also from UNESCO. The purpose of the Seminar was to discuss the major issues facing mathematics education at school level in European countries, to assess how far their problems are shared ones, and to explore possibilities of collective action towards solutions. The 3 major themes were the spread of mixed-ability teaching, and the resultant increased demands on pre-service training and on in-service training of mathematics teachers.

The discussions were most fruitful, not only in the exchange of information, but in the sharing of many problems and attempted solutions, which proved common to very different national educational situations. In particular, the difficulties of teaching mathematics effectively in mixed-ability classes within a comprehensive school were exercising mathematics educationalists in all the countries represented.

Current experience from a number of non-European countries proved to be highly relevant. In particular, a project involving individualised mixed-ability mathematics teaching in Botswana, Lesotho and Swaziland was mentioned as providing an example of an attempt to solve very similar problems in very different cultural and economic circumstances.

The Seminar themes will be developed further at the Third ICME Congress in August 1976, at which nearly all the Seminar participants will be playing key roles.

27. ASIAN REGIONAL CONFERENCE ON DEVELOPMENT OF INTEGRATED CURRICULUM IN MATHEMATICS FOR DEVELOPING COUNTRIES IN ASIA (see SEN 28:16)

1. Between its four-yearly International Congresses, the International Commission on Mathematical Instruction (ICMI) sponsors a small number of regional conferences on particular aspects of mathematical education. One of these regional conferences took place in India in December 1975.

2. The theme of the conference was "The Development of Integrated Curriculum in Mathematics for Developing Countries in Asia". As well as ICMI, it was sponsored by the Indian National Science Academy, with support from the International Mathematical Union, UNESCO, the Indian University Grants Commission and the Indian National Council for Educational Research and Training.

3. The conference took place at the V.S. Mehta College of Science, Bharwari, Uttar Pradesh, India. Bharwari is a rural area about 25 kms from Allahabad and provided an excellent setting for the conference.

4. The conference lasted for 6 days, 15–20 December. There were nearly 50 Indian participants, and representatives of 7 other Asian countries: Afghanistan, Bangladesh, Iran, Iraq, Malaysia, Singapore and Sri Lanka. 4 international specialists from outside this region were also invited:

Professor S Iyanaga (Japan), President of ICMI
Professor B Christiansen (Denmark), Vice-President of ICMI
Professor Sir M J Lighthill FRS (UK), Past-President of ICMI
B J Wilson (The British Council, London)

5. The conference realised that "integration" of mathematical education must mean different things at different levels of the educational system. At primary level, it means integration with other subjects, and with the local environment; mathematics should not be purely something that belongs to a classroom and to a textbook, but should be related to the rest of the child's experience of life. At the secondary level, it is

important that mathematics is taught as a unified subject, with the traditional barriers between arithmetic, algebra and geometry being allowed to dissolve. At the higher levels of school education, and at the university level, the teaching of mathematics should be closely related to the applications of mathematics, so again breaking down the compartmentalisation of learning between different subjects.

6. A report of the conference will be available in due course and will be notified in SEN.

28. INTERNATIONAL MATHEMATICAL OLYMPIAD 1975

The 1975 International Mathematical Olympiad took place in Bulgaria in July. Seventeen countries took part, each with a team of 8. The Olympiad is for people still at school, normally aged 17 or 18, although this year the youngest member of the British team was barely 15. The competition consists of 2 4-hour papers, each paper consisting of 3 compulsory questions. The scores of each participant are added together to arrive at national totals.

The first 6 places in 1975 were:

Hungary	258
East Germany	249
USA	247
USSR	246
Great Britain	239
Austria	192

The maximum possible score was 320.

Next year's Olympiad will take place in July 1976 in Austria.

29. INTERNATIONAL WORLD OF COMPUTER EDUCATION

The "International World of Computer Education" is published approximately six times per year in English and French. It is the official publication of the International information Centre for Computing in Secondary Education, which is a project of the Centre for Education Research and Innovation within the OECD.

Volume 1, no 10 (October 1975) includes reports on the second world conference on Computers in Education, held in Marseilles from 1–5 September 1975.

The journal also publicises the:

COMPUTER BOOKLIST FOR SCHOOLS – published by the British Computer Society

This list should prove very useful for all those who need to choose books for syllabuses, local courses or their own interest.

Books are arranged alphabetically, by author, together with publisher and latest known price; a comment is added, as a guide to the ability level expected of the reader, or the suitability of the book for particular purposes.

Copies of the booklet may be obtained from the International Information Centre for Computing in Secondary Education, Moray House College of Education, Holyrood Road, Edinburgh EH8 8AQ, Scotland.

30. EIGHTEENTH LONDON INTERNATIONAL YOUTH SCIENCE FORTNIGHT, 28 July – 11 August 1976

Applications are now invited from science students throughout the world to participate in this Science Fortnight, which is an annual gathering of about 400 students, half from Britain and half from many other countries. The participants follow a programme of scientific lectures, visits and discussions, as well as social events. The aim of the Science Fortnight, organised by the Council for International Contact, is to foster international friendship through a shared interest in science and its application to modern problems.

Participants should be in the 17–22 age group, and possess a good working knowledge of English. The cost of participation is approximately £100; this covers all London expenses except pocket money, but does not include travel to and from London.

Further information and application forms can be obtained from The Council for International Contact, P O Box 818, 179–183 Fulham Palace Road, London W6 8QU.

31. INTERNATIONAL YOUTH FEDERATION FOR ENVIRONMENTAL STUDIES AND CONSERVATION (IYF)

The Federation, which is sponsored by the International Union for Conservation of Nature and Natural Resources (IUCN) is organising a series of regional training courses in each continent. The purpose of these Courses is to

provide youth leaders with the know-how and commitment to organise environmental youth activities within the framework of their country's development.

In March 1974, an Eastern Africa Youth Course in Environmental Conservation was held in Nairobi; and in May 1975 a workshop in Environmental Education took place in Delhi, attended by youth leaders from 4 Asian countries. The latest course in environmental education took place from 20–30 December 1975 in Hong Kong, for youth leaders in South East Asia.

In Hong Kong, young people were able to study the impact of man on his environment, and discuss solutions with scientists and government officials; they were instructed in the basic principles of ecology, in the economic and social basis of environmental degradation, and in the programmes of UN agencies and conservation organisations in different parts of the world. Participants learned how an environmental youth group can be organised and administered in cooperation with school and university youth, and each contributed a report on the situation in his own country, which will be included in the Course proceedings, to be distributed by IYF.

Further information, on past and future training courses is obtainable from the Federation, c/o IUCN, 1110 Morges, Switzerland.

INDEX

32. BRITISH COUNCIL SCIENCE EDUCATION NEWSLETTER INDEX

This index covers issues 19 – 28.

In the references given below the number before the point gives the appropriate issue of SEN, whilst that after the point gives the relevant paragraph.

Where a number of references are given, those referring to **key articles** are in bold type.

An **asterisk** indicates that the article is concerned mainly with publications (eg of the project referred to). References to journals, monographs, reports, etc, will be found under **PUBLICATIONS**.

References to **British Curriculum Development** projects will be found under the following main references:

MATHEMATICS TEACHING PROJECTS
NUFFIELD SCIENCE TEACHING PROJECTS
SCHOOLS COUNCIL PROJECTS
SCOTLAND
and Individual Subjects

References to **Overseas Curriculum Development Projects** will be found mainly under individual countries and major agencies, eg UNESCO.

There are also general references under **CURRICULUM REFORM AND DEVELOPMENT**, which covers both the UK and other countries.

Back copies of issues 22 and 28 only are available. Photocopies of important articles can be made available if necessary. Applications for back copies of SEN, etc, should be made through the local British Council office, or to Schools and Further Education Department in London.

'A' LEVELS
See GCE 'A' LEVELS

ABSTRACTS
An Application of Programmed Instruction to Laboratory Work in a Preliminary Physics Course: 21.22.2
Attitude Assessment in Science Teaching 21.22.4; (Nuffield) 23.19.1
Balances for School Use: 22.18.2
Biology and the Peasant Farmer: 22.18.4
Broadening the base (1–2): 19.21.5
The changing scene of examinations at A level: 19.21.6
Chemical Bonds – A collaborative programme, Professor R Shaw 21.22.1
A Chemist in China, W G Sewell 21.22.1
Chemistry for Prosperity – the work of TTI, G R Ames 21.22.1
Children's Understanding of the Classification of Living Organisms 25.19.1
China Today, Sir David Martin 21.22.1
Classification, Children's understanding of:
The Design and Evaluation of Science Courses at the Open University: 23.19.4
Designing a Laboratory: 20.21.1
Development and Future Trends in Precision Weighing: 22.18.2
Development – Problems of Understanding, Sir Hugh Springer 21.22.1
Early stages in the diffusion of the Nuffield A-level Biological Sciences Project: 24.23.1
Evaluation of Chemistry syllabuses in Scotland: 24.23.3
An Evaluation of the Nuffield O-level Biology Course Materials and their use: 25.19.2
Evaluation studies of the Nuffield 'A' level Biology Trials 2: 19.21.3 4 & 5: 20.21.5
Examining Chemistry at CSE Level: 20.21.2
Examining in Degree Courses: 20.21.4
Flourishing jungle of mini-computers: 25.19.3
India – A sub-continent looks ahead, Atmaram and T R Seshadri: 21.22.1
An Individualized Course for Learning Chemistry: 19.21.1
Intellectual growth and understanding Science 24.23.2
Iron and Education in Uganda: 22.18.3

ABSTRACTS (Cont'd)
Material available for Environmental Education: 22.18.5
Mathematics and Science in the Secondary School: 23.19.7
Mathematics for the Majority Continuation Project: 23.19.6
Metrication in the School Curriculum: 19.21.4
The Nuffield Physical Science Course: 23.19.2
Nuffield and the Universities)
The Nuffield Scheme and its future influence) 20.21.3
Problems and rewards in teaching Nuffield A level)
Nuffield A level Chemistry: a personal view)
The Ox Plough Revolution 21.22.1
The place of geometry in mathematical education 24.23.4
The Planning and Teaching of Science according to National Needs: 23.19.5
Pre-School Pre-Mathematics: 22.18.1
Research in chemical education: reassessment: 19.21.2
Science for Development in Guyana, D H Irvine 21.22.1
Science Teaching – An African View, R J Syme 21.22.1
Scientific concepts and gaming 24.23.5
Scientific Information: 19.21.7
Simulation in science education 24.23.6
Small electronic calculators 24.23.7
Social and Subject Factors in Attitudes to Science: 22.18.7
Some recent developments in chemistry teaching in schools 21.22.3
On Teaching Problem Solving in Mathematics: 20.21.6
Testing and Evaluation: 23.19.3
To Feed the Poor 21.22.1
The Transition from School to University Mathematics: 21.22.5
Venn Diagrams Must Go? (1) (2); Must Venn Diagrams Go? 22.18.6

AFRICA
Project in Advanced Maths (West): 27.20
UNESCO Pilot Project for Biology Teaching in Africa: 27.28
Educational Materials Exhibition – Didafrica: 27.32

AIDS TO COMMONWEALTH TEACHING OF SCIENCE (ACTS)
21.2

ALGEBRA SKILLS SET SRA
24.15

ANGLO-DUTCH COOPERATION
In science education: 22.19

APPARATUS
23.18.3

ARGENTINA
Conceptos De Matematica: 27.22

ARTIFICIAL INTELLIGENCE:
25.18.8*

ASSESSMENT
21.4; 23.19.3 (Abstract)
Attitude Assessment in Science Teaching: 21.22.4 (Abstract)
Assessment of Attainment in VIth Form Science: 23.18.2
See also: Progress in Learning Science – Schools Council Projects

ASSOCIATION FOR SCIENCE EDUCATION
Annual Meetings: 21.3; 24.6; 26.5; 27.1; 28.3;
Publications: 19.20.1; 20.9; 23.10; 27.1;

ASSOCIATION OF TEACHERS OF MATHEMATICS
Annual Conference: 19.14; 25.11;
Publications: 23.18.12;

ASTON UNIVERSITY
24.4.1

ATCDE
Association of Teachers in Colleges and Departments of Education
27.11

ATTITUDES TOWARDS SCIENCE
21.22.4 (Abstract)
22.18.7 (Abstract)
See also: SCHOOLS COUNCIL PROJECTS

AUSTRALIA
21.23; 24.24; 25.20

BIBLIOGRAPHIES
for Chemistry Teachers: 24.22.4; 27.18.2.6

BIOLOGICAL EDUCATION
MSc in, at Keele University: 26.1
International Congress on improvement of: 27.27
Newsletter: 27.26

BIOLOGICAL SCIENCES: INTERNATIONAL UNION OF (IUBS):
27.26 (Biological Education Newsletter)

BIOLOGY
Certificate of Sixth Year Studies: 27.17

BIOLOGY – references
23.18.10

BIRMINGHAM UNIVERSITY
27.15 (B Phil)

B Phil
27.16 (University of Birmingham) in Science/Maths Education

BRITISH COUNCIL
Science Information Service: 19.21.7;

BRITISH COUNCIL COURSES
International course on Curriculum Development in Secondary Science: 20.25
PROCESSES OF SCIENCE CURRICULUM DEVELOPMENT: 22.1; 23.1; 26.27;
CURRICULUM DEVELOPMENT IN SECONDARY MATHEMATICS: 22.8; 25.24

BRITISH HONDURAS
19.23

BRITISH THORNTON ELECTRONIC CALCULATOR SELECTION SERVICE
24.16

'BROADENING THE BASE'
19.21.5

BSc
In Science and Education: 27.4

CAMEROON
22.20;

CARIBBEAN
Integrated Science and Teacher Education: 27.21
Caribbean Mathematics Project: 28.15

CEDO (CENTRE FOR EDUCATIONAL DEVELOPMENT OVERSEAS)
22.17.14

CENTRE FOR STUDIES IN SCIENCE EDUCATION – LEEDS UNIVERSITY
23.18.5; 24.22.19; 27.5; 27.18.2*

CHEMICAL EDUCATION
At the Tertiary Level: 26.22.1
In Europe: 26.26
Research: 19.21.2 (Abstract)
MSc: 21.10
Chemical Nomenclature: 20.20.5; 22.3
B Phil: 23.8

CHEMICAL EDUCATION (Cont'd)
Symposium and Report: "The discipline of Chemistry – Its place in education"; 23.9 .
In Industry: 25.2
Symposium: 27.7
Educational Technology in: 28.20
Inventory of National Activities in: 28.21

CHEMICAL SOCIETY
23.9; 25.2°
Education Division: 20.7; 22.5
Curriculum Subject Group: 24.3

CHEMISTRY:
Examining at CSE level: 20.21.2

CHEMISTRY TEACHING
An Individualised course for learning chemistry: 19.21.1
In Schools: (Abstracts) 21.22.3
University Chemistry Teaching: 23.18.6

CHINA
21.22.1 (Abstracts)

COMBINATORICS AND PROBABILITY:
in Primary Schools – Symposium on: 26.34.2

COMBINED SCIENCE
A double 'O' level subject: 21.6

COMMONWEALTH ASSOCIATION OF SCIENCE AND MATHEMATICS EDUCATORS. (CASME)
26.28; Awards 28.30

COMPUTER APPRECIATION FOR THE MAJORITY
26.11

COMPUTER EDUCATION
Bibliographies: 26.11
British Computer Society: 26.11
Centres: 24.12.2 and 3; 24.31
Computers in the Curriculum Project: 23.14; 26.13;
Courses: 24.12
Games for Education: 19.13
In Schools: 21.15; 22.13; 24.12.12
In Scotland: 19.12; 24.12; 27.14.2
Mini/Travelling Computers: 24.12.2.3; 25.19.3; 27.14.2
National Computing Centre: 19.11; 26.11
Publications: 21.15
Second International Conference: 23.29; 26.34.3; 27.25
Small Computer Users Group: 22.13;

CONCEPTS: SCIENTIFIC AND MATHEMATICAL
Asian Seminar on Development of Science/Maths concepts in Children: 19.31
Concepts in Maths: 25.7
Concepts in Secondary School Maths and Science Project: 26.14
Seminar on Development of Science and Maths
Concepts in Young Children in African Countries: 27.29

CONFERENCES
Chemical Education: 27.7
Commonwealth, on Education: 22.26
Computer Education: 23.29; 26.34.3; 27.25
Development of Integrated Curriculum in Maths for Developing Countries in Asia: 28.16
Development of Science/Maths Concepts in Children: 19.31
Development of Science and Maths Concepts in Young Children in African Countries: 27.29
Developments in Chemical Education at Tertiary Level: 26.22.1
Education of Teachers for Integrated Science (ICSU): 22.28
Educational Technology in Chemistry Teaching: 26.34.4
Educational Use of Living Material/Organisms: 19.29; 25.26
Environmental Science Education: 27.30

CONFERENCES (Cont'd)
European Science Education Seminar: 22.25
Evaluation of Integrated Science: 28.23
Examinations and Assessment: 24.20
Guinness Awards Commonwealth Conference: 22.27
ICME – JSME Regional Conference in Tokyo: 26.33
ICMI Symposia: **26.29**; 26.34.2 and 6, 26.31; 28.27; 28.28
Improvement of Biology Education: 27.27; **28.25**
Independent Learning in Tertiary Science Education: 27.6
Individual and small group methods in the Teaching of Science: 23.5
Integrated Maths Curriculum Development for Developing Countries: 26.34.5
Integrated Science Teaching in S E Asia: 24.28
Interactions between Linguistics and Mathematical Education: 26.31; 28.27
International Perspectives of Design Education: 23.26
Living with Technology: 26.18
Mathematical Applications at School Level: 23.27
Mathematics Education: 20.24 (Internat.); 25.25 (European)
New Trends in the Utilization of Educational Technology: 26.22.7
Physics Education: 28.18
RECSAM Workshop on Integrated Science Teaching in Asia: 24.28
School Science Equipment: (India) 24.26;
School-based Curriculum Development: 23.28
Science Education in East Africa: 19.26
S E Asia Regional Science Teachers' Assoc. Conference: 19.30
Secondment of Chemists and Chem. Engineers from Industry for Teacher Training: **21.9**
Strategies for the Improvement of Education in Science and Maths: 20.27
Teaching of Geometry: 25.28
Teaching of Technology in secondary schools: 20.26
Uganda Annual Chemical Society Conference: 19.28
UNESCO/IUPAP Conference on the Teaching of Physics: 24.30

CONSERVATION EDUCATION PROJECT
26.16

CONTINUING MATHEMATICS PROJECT
20.14
24.7

CURRICULUM REFORM AND DEVELOPMENT, EVALUATION ETC
COLLEGE CURRICULUM SCIENCE STUDIES: 20.8
CURRICULUM ANALYSIS RESEARCH PROJECT: 21.20
SCIENCE CURRICULUM PROJECTS, LIST: **21.1**
SCIENCE USES MATHEMATICS (SUM): 22.10

DEGREE COURSES
B Phil: 23.8; 27.16
BSc: 27.4
Grad. Cert. in Education: 27.5
MA: 27.5
M Phil: 27.5
MSc: 21.10; 22.6; 26.1; 26.2
PhD: 27.5

DESIGN AND CRAFT EDUCATION
Project (formerly RESEARCH AND DEVELOPMENT PROJECT IN HANDICRAFT): 20.16;
Conference: 23.26

DEVELOPING COUNTRIES
The role of Science in: 21.22.1

DEVELOPMENTS IN MATHEMATICAL EDUCATION
See DIME PROJECTS

DIDAFRICA
27.32

DIME PROJECTS
(Developments in Mathematical Education): 24.11.6

DIPLOMAS
in Science and Maths for Education in the middle years of schooling: 26.15 (T Huxley College); 28.8
in Environmental Education: 26.17

DISADVANTAGED CHILDREN:
Teaching materials for: 27.18.8

EDINBURGH UNIVERSITY
24.4.2

EDUCATIONAL TECHNOLOGY
21.19; 21.22.2; 24.18; 26.22.7; 26.34.4; 28.4; 28.11; 28.20
APLET: 21.19

EDUCATIONAL USE OF LIVING ORGANISMS:
19.29; 25.6; 25.26

ELECTRONIC CALCULATORS
Small: 24.23.7

ENGINEERING
GENERAL EDUCATION IN ENGINEERING (GEE): 24.17

ENGINEERING SCIENCE
21.18; 24.19;

ENVIRONMENTAL SCIENCE EDUCATION
27.30

ENVIRONMENTAL STUDIES
20.3
Films: 25.14
Bulletin of Environmental Education (BEE): 25.18.7

EVALUATION
Biology: 19.21.3; 20.21.5; 25.19.2;
Chemistry: 24.23.3
Evaluation and Testing: 23.19.3 (A)
Mathematics: 26.29 (Modern)
Science Courses: 23.19.4 (A)
Science Education in 19 Countries: 25.23

EXAMINATIONS AND ASSESSMENT
24.20

EXAMINING IN DEGREE COURSES:
20.21.4

FIFE MATHEMATICS PROJECT
20.13; 24.11.5

FILMS
Environmental Studies: 25.14
Metrication: 19.15.4.2.3
Physics: 19.6

GAMBIA
TVC: 19.22

GAMES IN EDUCATION
Chemistry: 28.5

GCE 'A' LEVEL PHYSICS
19.21.6

GEOGRAPHY
For the Young School Leaver: 22.15
School Geography in the Changing Curriculum: 26.21

GEOMETRY
TEACHING OF (ICMI-IDM): 25.28

GERMANY
'IPN' – Institut für die Pädagogik der Naturwissenschaften: 26.23

GHANA
GAST: 23.20; 27.19
JOINT SCHOOLS MATHEMATICS PROJECT: 23.20

GLOUCESTERSHIRE MATHEMATICS WORKCARDS
26.10

GRADUATE CERTIFICATE IN EDUCATION
Centre for studies in Sci.Ed. Leeds: 27.5

GROUP FOR RESEARCH AND INNOVATION IN HIGHER EDUCATION
See: NUFFIELD GROUP FOR RESEARCH AND INNOVATION IN HIGHER EDUCATION

GUINNESS AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS
1971/72: 19.32
1972/73: 19.33; 22.30
1973/74: 22.30; 25.27
1974/75: 28.29

GUYANA
Science for Development: 21.22.1
TVC: 19.22

HIGHER EDUCATION LEARNING PROJECT – PHYSICS
See: PHYSICS TEACHING PROJECTS

HONG KONG
Science Teachers' Journal: 23.31

ICASE (INTERNATIONAL) COUNCIL OF ASSOCIATIONS FOR SCIENCE EDUCATION)
22.29; 27.19; 27.23 and 24

ICME (INTERNATIONAL COMMITTEE ON MATHEMATICS INSTRUCTION)
25.28
Conference, Tokyo: 26.33

ICSU (INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS) (CIES)
27.28; 28.19

IMU
General Assembly, 1974: 26.20; 28.16

INDEPENDENT LEARNING IN SCIENCE
23.5; 26.3; 27.6 (In Tertiary Science Education)

INDIA
21.22.1
Bombay Science Improvement Project: 21.24
TVCs: 19.22; 25.21
Science Education Journals: 20.23
Workshop on Environmental Studies (Bombay): 20.23

INDONESIA
TVC: 19.22

INSTITUTE OF BIOLOGY
Publications: 27.15

INSTITUTE FOR DIDACTICS OF MATHEMATICS (IDM):
25.28

INTERMEDIATE TECHNOLOGY
24.22.18

INTERNATIONAL ASSOCIATION FOR THE EVALUATION OF EDUCATIONAL ACHIEVEMENTS (IEA)
25.23

INTERNATIONAL FEDERATION OF INFORMATION PROCESSING (IFIP)
26.34.3
27.25

INTERNATIONAL STUDIES IN EVALUATION: SCIENCE EDUCATION IN 19 COUNTRIES
25.23

INTERNATIONAL UNION OF BIOLOGICAL SCIENCES (IUBS)
27.26

INTERNATIONAL YOUTH SCIENCE FORTNIGHT
1974: 24.29
1975: 26.34.1; 27.31; 28.24
1976: 28.24

IRAN
Development of maths and science education: 21.25
Science teaching conferences: 23.22

ISRAEL
Science Apparatus: 19.24
ISTEP: 25.22

ITALY
22.21

IUPAC (INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY)
Meeting on Educational Technology in Chemical Education: 28.20

JAMAICA
TVC: 19.22
Journal of Association of Science Teachers: 20.22

KEELE UNIVERSITY
MSc (Education): 22.6

KENYA
22.22; 27.30; 28.14.1 and 2
Science Teachers' Association (Journal): 28.14.1
Teacher Education Resource Service: 28.14.3
TVC: 19.22

LABORATORIES
Design: 20.21.1
Technicians: 25.3*

LATIN AMERICA
22.23

LEBANON
23.23

LEEDS UNIVERSITY
24.4.3; 27.5; 27.18.2

LEICESTER UNIVERSITY
24.4.4

LESOTHO
27.30
TVC: 19.22

LINGUISTICS AND MATHEMATICAL EDUCATION
Nairobi Symposium on: 26.31

MALAYSIA
TVC: 19.22

MALTA
TVC: 19.22

MANCHESTER AND REGION CENTRE FOR EDUCATION IN SCIENCE, ENGINEERING AND TECHNOLOGY
20.17

MANCHESTER UNIVERSITY
24.4.4

MATHEMATICAL ASSOCIATION
Annual Conference: 25.10

THE MATHEMATICAL NEEDS OF 'A' LEVEL PHYSICS STUDENTS
22.11

MATHEMATICS
FOR BIOLOGISTS: 27.15
NEW MATHEMATICS SYLLABUS B (SCOTTISH): 24.11.3
SECONDARY, CURRICULUM DEVELOPMENT IN: 25.24
& SCIENCE IN SECONDARY SCHOOLS: 23.19.7 (A)
SURVEY: 22.12
TEACHING CONFERENCES: 20.24; 25.10
TEACHING PROBLEM SOLVING IN: 20.21.6 (A)
TRANSITION FROM SCHOOL TO UNIVERSITY MATHS: 21.22.5

MATHEMATICS ADVISORY UNIT
24.13

MATHEMATICS EDUCATION
European Seminar: 25.25

MATHEMATICS EDUCATION RESEARCH
24.11.7

MATHEMATICS FOR GENERAL EDUCATION (SCOTTISH)
24.11.4; 27.17

MATHEMATICS FOR THE MAJORITY – CONTINUATION PROJECT
see SCHOOLS COUNCIL PROJECTS: Secondary Mathematics Project

MATHS 'O' GRADE COURSE
27.17

MATHEMATICS AND SCHOOL CHEMISTRY
24.14

MATHEMATICS (TEACHING) PROJECTS
list of British: 21.11
Early Mathematical Experience Project: 23.11;
Mathematics Teacher Education Project: 27.11

MAURITIUS
TVC: 19.22

METRICATION
19.15; 19.21.4
Bibliographies: 19.15.6

MICROBIOLOGY IN SCHOOLS ADVISORY COMMITTEE (MISAC)
21.8

MIDDLESEX POLYTECHNIC
24.4.6

MODULAR MATHEMATICS ORGANISATION
24.11.2

MONTSERRAT
TVC: 19.22

MOTIVATION
20.14.1

NATIONAL ASSOCIATION FOR ENVIRONMENTAL EDUCATION
19.5

NATIONAL CENTRE FOR SCHOOLS TECHNOLOGY
20.18

NATIONAL COMPUTING CENTRE LTD (NCC)
(19.11) 26.11
See: COMPUTER EDUCATION

NATIONAL COUNCIL FOR EDUCATIONAL TECHNOLOGY (NCET)
24.18

NATIONAL FOUNDATION FOR EDUCATIONAL RESEARCH (NFER)
New Maths Study of Attainment Tests: 21.16

NATIONAL LENDING LIBRARY FOR SCIENCE AND TECHNOLOGY (Now BRITISH LIBRARY)
Photocopying Service: 19.21.7.2

NETHERLANDS
Anglo-Dutch Cooperation: 22.19
New Trends in the Teaching of the Physical and Integrated Sciences –
BC Course in London: 22.19; 23.24

NIGERIA
27.30; 28.17
African Primary Science Programmes: 26.24
Curriculum Development: 19.25; 28.17

NOTTINGHAM UNIVERSITY
SCHOOL OF EDUCATION: 24.13

NOTTINGHAMSHIRE SCHOOLS MODE 3 INTEGRATED SCIENCE COURSE:
25.5

NUFFIELD GROUP FOR RESEARCH AND INNOVATION IN HIGHER EDUCATION
23.16; 24.21; 25.17

NUFFIELD INFORMATION PROJECT
28.1

NUFFIELD MATHEMATICS PROJECT (5–13)
19.10; 26.9*

NUFFIELD scheme and it future influence:
20.21.3

NUFFIELD SCIENCE TEACHING PROJECTS
SCIENCE TEACHER EDUCATION PROJECT: 24.2; 25.22
REVISION OF NUFFIELD 'O' LEVEL BIOLOGY, CHEMISTRY AND PHYSICS: 24.1*; 27.2
SECONDARY 'A' LEVEL PROJECTS
Attitudes to Science: Comparison with non-Nuffield students' attitudes (Abstract): 23.19.1
BIOLOGY:
Evaluation: 18.29.4; 19.21.3; 20.21.5: 24.23.1
Diffusion: 24.23.1
CHEMISTRY: 24.1.2;
PHYSICAL SCIENCES: 20.1*; 23.3; 23.19.2(A); 25.1
PROBLEMS AND REWARDS IN TEACHING NUFFIELD 'A' LEVEL: 20.21.3
SECONDARY NON-EXAMINATION
Combined Science (11–13); 21.5; 27.18.1
16+ Science: 20.2; 23.4
SECONDARY 'O' LEVEL PROJECTS:
General: 27.18.1
Biology: 24.1; 27.2; 25.19.2
Chemistry: 24.1; 27.2
Physics: 24.1

NUFFIELD and the Universities:
20.21.3

NUFFIELD SECONDARY SCIENCE: AN EVALUATION
27.10

OECD (ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT)
Publications: 22.17.13

OBJECTIVE TESTING
25.2*;

'O' LEVELS
See: GCE 'O' LEVELS

OPEN UNIVERSITY
19.16
Higher degrees 19.16.5
Design and evaluation of science courses: 23.19.4(A)
Technology for teachers: 25.13

'PEOPLE AND RESOURCES' – Conservation Education Project
See: CONSERVATION EDUCATION PROJECT

PERU
Physics teaching: 24.25

PHYSICS EDUCATION
MSc in: 26.2 (Reading);

PHYSICS TEACHING
Conferences: 24.30
Peru: 24.25
Programmed learning in: 21.22.2

PHYSICS TEACHING PROJECTS
Higher Education Learning Project (HELP): 23.6
Physics Interface Project: 21.7
see also: NUFFIELD PROJECTS

PIAGET:
25.7

PRIMARY MATHEMATICS
27.12
Early Mathematical Experiences Project: 23.11
Evaluation Studies: 20.10; 21.13; 23.12
See also: GLOUCESTERSHIRE MATHS WORKCARDS
NUFFIELD MATHEMATICS PROJECT
SCHOOLS COUNCIL PROJECTS

PRIMARY SCHOOLS BIOLOGY SCHEME
24.5

PROFESSORS OF SCIENCE EDUCATION
Biological Education: 20.5

PROGRAMMED LEARNING
See: EDUCATIONAL TECHNOLOGY

PROJECT TECHNOLOGY
See: SCHOOLS COUNCIL
(Curriculum Development)

PUBLICATIONS
ICI Publications: 19.7
RIC Publications: 19.20.2
Shellmex: 19.6
Unesco:
New Trends in Integrated Science Teaching: (Vol.2) 22.17.1
New Trends in Mathematics Teaching: (Vol.33) 22.17.8
New Trends in Physics Teaching: (Vol.2) 20.20.11
Pilot Project for Teaching Biology in Africa: 27.28; 28.22
Teaching School Physics: 20.20.12

PUBLICATIONS
See also: ASSOCIATION FOR SCIENCE EDUCATION SCHOOLS COUNCIL PUBLICATIONS
AUDIO-VISUAL/EDUCATIONAL AIDS
Nuffield Audio-Visual Package for A-level
17.23.21
COUNCIL OF EUROPE PUBLICATIONS
European Curriculum Studies No 1 – Mathematics: 20.20.20
No 3 – Biology: 20.20.21
No 4 – Chemistry: 20.20.22
No 6 – Physics: 20.20.23
PERIODICALS: INDIVIDUAL TITLES
Biological Education Newsletter (International Union of Biological Sciences -- IUBS): 27.26
Bulletin of Environmental Education (BEE): 23.18.7
Chemical Society Reviews: 19.21.2
Chemistry in Britain 21.22.1
Education and Training: 19.21.5

PUBLICATIONS (Cont'd)

Education in Chemistry (RIC/CS)	19.21.1; 21.3; 22.18.3; 27.3
Education in Science (ASE):	28.1
Education	3.13; 23.18.4
Educational Development International – CEDO journal:	22.17.14
FRAME (General Education in Engineering Project)	24.17
Journal of Biological Education (Inst. of Biol.):	19.21.3; 20.21.5; 22.18.4; 24.23.1; 25.19.1; 27.15;
Kenya Science Teachers Association Journal	28.14.1
Mathematical Education for Teaching:	26.7; 27.11
Mathematical Gazette:	21.22.5; 22.18.1; 24.23.4
Mathematics Teaching (ATM):	20.21.6; 22.18.6
New Scientist:	25.19.3
Out of School Scientific and Technical Education (ICC)	19.20.12
Physics Education (Inst. of Phys. & Phys. Soc.):	19.21.6; 22.11
Programmed Learning and Educational Technology:	21.22.2; 24.23.5 & 6
SATIS:	22.4
School Science Review (ASE):	21.22.4; 22.18.7; 25.19.2
Science Policy:	22.17.13
Science Teaching Equipment:	22.18.2
Studies in Science Education:	23.18.5; 24.22.19; 24.23.2; 24.23.3; 27.18.2
Trends in Education:	19.21.4
Which	24.23.7

REPORTS/REVIEWS

Aims, Methods & Assessment in Advanced Science Education	25.18.7; 26.22.1
Alternatives to the Lecture in Chemistry:	27.18.7
Anatomy, Physiology and Health (Ord. Grade) Memo No 11 (Scottish):	23.18.11
Artificial Intelligence:	25.18.8
Aspects of Educational Technology V:	19.20.18
Chemical Education in Industry (Chemical Society)	25.2
Chemical Labelling (ASE Report)	26.22.5
Chemical Society Reviews	21.22.3
Development of Science and Mathematics Concepts in Young Children in African Countries:	27.29 (Seminar report)
The Discipline of Chemistry – Its Place in Education	23.9
The Education and Training of Science Laboratory Technicians in Schools and Colleges:	25.3
Educational Technology and the Expansion of Education – NCET	24.18
Electrostatics for Certificate of Sixth Year Studies:	27.17
Entry to Chemistry Courses at the Tertiary Level – A preliminary survey	20.20.10
Environmental Science Education for Pre-Service Primary Teacher Education (Workshop Report)	27.30
The Human Environment: the British view	20.20.28
Integrated Science and Teacher Education (ISTE) – Caribbean Workshop:	27.21
International Studies in Evaluation – Science Education in 19 countries:	25.23
Inventory of National Activities in Chemical Education:	28.21
Manipulative Skills in School Mathematics: – SMP pamphlet	27.13
The Mathematical Needs of 'A' Level Physics Students:	22.11
Mathematics Eleven to Sixteen: (Mathematical Assoc.)	26.22.6
Mathematics for Biologists:	27.15
Mathematics: Society and Curricula (Griffiths & Howson)	26.22.2
New trends in the Utilisation of Educational Technology for Science Education, UNESCO:	26.22.7
Nuffield Secondary Science: An Evaluation	27.10

PUBLICATIONS (Cont'd)

Objective Testing – A Workshop Report (Chemical Society)	25.2
Pattern and Variation in Curriculum Development Projects:	23.18.1
Primary Education in Scotland – Mathematics Curriculum Paper 13:	22.9
School Geography in the Changing Curriculum:	26.21
Science: A Curriculum Model for the 1980's	27.17
Science Education in Africa (Report of the Sixth Leverhulme Conference):	19.20.11
Science Education in 19 Countries (International Studies in Evaluation):	25.23
Science for the 13–16 Age Group (ASE)	23.10
Scottish Education Department – Consultative Committee on the Curriculum – 2nd Report:	19.17
16–19 Growth and Response: 2, Examination Structure, Schools Council Working Paper No 46:	22.17.11
Teaching and Learning in Chemistry: Conference Proceedings	27.18.6
Technical Education in Secondary Schools (SED):	20.20.27
UNESCO (Workshop) – Integrated Science Teaching in the Asian Region:	24.28 (RECSAM 1972)
UNESCO Regional Seminar on School Science Equipment (New Delhi)	24.26
University Chemistry Teaching:	23.18.6
What's Going on in Primary Maths – Report by the Primary Maths Project:	27.12
TEACHERS' HANDBOOKS/GUIDES	
Adaptable Furniture and Services for Education and Science:	21.21.10
Aims, Methods and Assessment in Advanced Science Education	25.18.7; 26.22.1
Animal Accommodation for Schools	25.6
Aspects of Educational Technology V see: REPORTS/REVIEWS above	
Assessment of Attainment in Sixth Form Science; Schools Council Examinations Bulletin 27:	24.22.13
Assessment Techniques – an introduction	22.17.12
A Bibliography of Resources for Chemistry Teachers:	24.22.4; 27.18.2.6
Biological References from the SSR and J. Biol. Ed:	23.18.10; 27.18.2
Chemical Nomenclature:	20.20.5; 22.3
Children Using Mathematics:	21.21.7
Data and the Chemist	21.21.4
The Development Puzzle	24.22.17
Environmental Education	21.21.3
Equipment for Audio-Visual Aids (1972/73)	21.21.9
Experiments in Radioactivity:	25.4
Fifteen Starters for the Secondary Classroom (ATM):	23.18.12
A Handbook of Biology Teaching Methods:	24.22.1
Hazards in the Chemical Laboratory (RIC):	19.20.2
Making Elementary Science Apparatus:	23.18.3
Mathematics: The later primary years, a Nuffield/CEDO Handbook for Teachers:	19.20.14
Mathematics through School:	19.20.13
New Thinking in School Geography (DES pamphlet No 59):	19.20.15
New UNESCO Source Book for Science Teaching	24.22.9
Nuffield Mathematics Project – Book 5 Computation and Structure:	21.21.8
Nuffield Mathematics Project Checking Up II	20.20.4
Nuffield Secondary Science: An Evaluation	27.10
Objective Testing: a guide for Science Teachers:	19.20.9; 27.18.2
Of Measures and Meaning	24.22.16
The Place of Science in Environmental Education:	24.22.15
Plant Physiology	21.21.2
The principles of objective testing in chemistry:	22.17.2
The principles of objective testing in mathematics:	22.17.2

PUBLICATIONS (Cont'd)

The production of School Science Equipment:	28.13.1
Project Environment	25.15
Quantitative data in science and technology (ASLIB)	21.21.5
Radio Isotope Experiments in Physics, Chemistry and Biology	24.22.10
Recommended Practice for Schools Relating to the Use of Living Organisms and Material of Living Origin:	24.22.2
Reference of Use to Teachers of Mathematics:	27.18.2.5
Research in Science and Mathematics Education – A list of theses for higher degrees in British Universities:	27.18.2.4
Resource Book on Chemical Education in the United Kingdom:	28.13.2
The Role of the Head Teacher (ASE Science and Primary Education Paper No 2):	26.22.4
Safeguards in the School Laboratory (ASE)	19.20.1
A Safety Handbook for Science Teachers	24.22.11
School Book Guide: Secondary Geography:	23.18.8
School Book Guide: Secondary Biology:	23.18.9
School Technology in Action:	26.22.8
Science and Mathematics Teachers Handbook (STAN):	28.17
Small Mammals:	25.6
Structured Questions in A-level Chemistry:	24.22.5
Teachers' Guide to Assessment in Modern Chemistry:	20.20.6
Teachers' Study Guide on the Biology of Human Populations: Version for Africa:	28.13.3
Teaching Environmental Studies in the Middle and Primary Schools:	19.20.17
The Teaching of Mathematics in the Primary School:	22.17.7
The Teaching of Science to Pupils of Low Educational Attainment:	24.22.14
Teaching Science in Australian Schools:	19.20.10
Techniques and Apparatus for the Science Teacher	24.22.1
Techniques and Problems of Assessment: A Practical Handbook for Teachers	24.22.12
Towards Numeracy	20.20.3

TEXTBOOKS, Packs etc

Caribbean Junior Biology:	20.20.16
Certificate Chemistry (Cane and Sellwood)	25.18.1
Chemistry: Facts, Patterns and Principles	20.20.8
Chemistry: A New Course for CSE	20.20.9
Chemistry by Concept:	22.17.5
Chemistry by Experiment and Understanding	19.20.3
Chemistry – Objectives and Completion Tests for O-level	25.18.2
CSE General Science Book 1 Matter and Energy) Book 2 Man and His Environment)	20.20.2
Discovering biology:	22.17.10
Discovering Chemistry	21.21.6
Experimental work in biology:	18.28.3; 20.20.19
Explore and Discover: Science for the Middle Years:	25.18.6
A First Geography of the Eastern Caribbean:	20.20.25
Geography in Education, a bibliography of British Sources 1870–1970	20.20.24
Heinemann Experimental Chemistry Series (Mee and Rogers)	26.22.3
Human Biology Objective and Completion Tests for O-level	24.22.3
Intermediate Technology – An Introduction from Voluntary Committee on Overseas Aid and Development	24.22.18
Introducing Chemistry:	27.18.5
Investigating Chemistry:	22.17.6
Looking at Life:	19.20.6
Materials Science Unit 1 – Motor Vehicle Technology:	28.13.4
Mathematics for Schools:	27.18.4
Methuen Studies in Science:	19.20.8
Modern Mathematics for East Africa:	27.18.3

PUBLICATIONS (Cont'd)
Modern Meteorology and Climatology: 19.20.16
Multiple Choice Papers in Advanced Level Physics 24.22.7
A New Practical Chemistry: 19.20.4
Objective Questions in Chemistry 20.20.7
Oxford Biology Readers 20.20.18
Patterns and problems in world agriculture: 20.20.17
Physics: Concepts and Models 20.20.14
Physics by experiment: 22.17.3
Physics by Investigation:
Probe 2 and Teacher's Book: 20.20.15
Physics Projects: 19.20.5
Plastics – Project Technology 25.18.3
The Polymorphism of Elements and Compounds 24.22.6
Project Technology Handbooks 20.19; 25.18.3
Questions and Problems in Pre-University Physics 24.22.8
School Projects in Natural History: 19.20.7
Simple Slide Rule: 22.17.9
Structure and Metals: 25.18.5
Structured Questions in Chemistry: 20.20.7
Studies in chemistry series: 22.17.4
1. Chemical equilibria P J Hills
2. The Modern Gas Industry D Scott Wilson
3. Chemical Kinetics N R Waite
4. The fine organic chemicals industry T F McCombie
5. Petrochemicals Today J P Stern and E S Stern
6. The chemistry of fibres J E McIntyre
7. The rusting of iron, causes and control U R Evans
8. Noble Gases and their influence on theories of Chemical Bonding G P Rendle
9. Photochemistry P Borrell
Thermodynamics (Cosmos Series) 25.18.4
West African Butterflies and Moths: 21.21.1
The Working World of Physics 20.20.13

QUESTION BANKS
Biology: 20.4

RADIOACTIVITY
Experiments in: 25.4*

READING UNIVERSITY
MSc in Chemical Education 21.10

RESEARCH AND INNOVATION IN HIGHER EDUCATION
See: NUFFIELD GROUP FOR RESEARCH AND INNOVATION IN HIGHER EDUCATION

ROYAL LIBERTY SCHOOL COMPUTER DEPARTMENT
21.14

RURAL STUDIES
28.7

SCHOOL MATHEMATICS PROJECT (SMP)
Workcards: 23.13*
Publications: 20.11; Manipulative Skills: 27.13

SCHOOL SCIENCE EQUIPMENT
See APPARATUS

SCHOOLS COUNCIL PROJECTS
Working Party on Dissemination: 19.18
Progress in Learning Science: 21.4; 22.2
Project Health Education: 22.16
CURRICULUM DEVELOPMENT
Computers in the Curriculum Project: 26.13
Environmental Studies: 19.4; 20.3*; 25.14
Geography 14–18: 25.12

SCHOOLS COUNCIL PROJECTS (Cont'd)
Geography for the Young School Leaver: **22.15**
Integrated Science (13–16 years) (SCISP): 19.1 & 2; **23.2**; 26.7; 27.9
Loughborough University, Engineering Science
Development Unit: **21.18**; 24.19
Mathematics Curriculum: A critical view: **21.12**
Project Environment: 25.15*
Project Technology: 19.19; 20[illegible]*; 25.18.3; 26.19; Briefs 28.12
Science 5/13 Project: **19.3**; 23.7; 26.6; 27.8
Secondary Mathematics Project (Maths for the Majority): 19.9; 23.19.6(A); 24.8*; 25.8; 28.6
EDUCATIONAL RESEARCH
Reading University VI Form Curriculum Project: 21.17; 24.9
Primary Mathematics Project: 20.10; 21.13; 23.12; 27.12
Progress in Learning Science: 21.4; 22.2

SCHOOLS COUNCIL PUBLICATIONS
23.18.1; 27.18.8
Bulletins: 23.18.2
Project Profiles: 26.20
Working Papers: 19.20.19; 20.20.26; 22.17.11
(A complete list of Schools Council Publications can be obtained from:
Publications Section, Schools Council, 160 Great Portland St, London W1N 6LL)

SCHOOLS INFORMATION CENTRE ON THE CHEMICAL INDUSTRY:
20.6*;

SCIENCE AND TECHNOLOGY INFORMATION SOURCES (SATIS)
22.4;

SCIENCE EDUCATION FOR THE LEAST ABLE
23.15.6
27.17

SCIENCE EDUCATION PROJECT IN AFRICA (SEPA):
27.29; 27.30

SCIENCE IN A SOCIAL CONTEXT (SISCON)
See: SISCON

SISCON: SCIENCE IN A SOCIAL CONTEXT PROJECT
24.4; 28.2

SCIENCE TEACHER EDUCATION PROJECT (STEP)
See: NUFFIELD SCIENCE TEACHING PROJECT
– STEP Teacher Training

SCIENCE TEACHING PROJECTS
list of **21.1**
SCHOOLS COUNCIL PROJECTS
NUFFIELD SCIENCE TEACHING PROJECT
See: INDIVIDUAL SUBJECTS
UNESCO

SCIENCE TEACHING APPARATUS
See: APPARATUS

SCIENCE 5/13 PROJECT
See: SCHOOLS COUNCIL PROJECTS

SCIENCE USES MATHEMATICS (SUM)
22.10; **28.9**

SCIREFS
20.20.1; 23.17 (full list)

SCOTLAND – BACKGROUND TO CURRICULUM DEVELOPMENT
Chemistry. Syllabuses evaluation: 24.23.3
Computers see: COMPUTER EDUCATION
Mathematics: 19.17.1
Projects in Mathematics: 22.14; **24.11**

SCOTLAND – BACKGROUND TO CURRICULUM DEVELOPMENT (Cont'd)
Projects in Science: 22.7; 21.1
See also. SMG; SCOTTISH MODULAR MATHS

SCOTTISH MATHEMATICS GROUP
24.11.1; 27.14*
Publications: 20.12; 27.14

SCOTTISH MODULAR MATHEMATICS
26.8*;

SCOTTISH CENTRAL COMMITTEE ON SCIENCE
27.17

SCOTTISH CENTRE FOR MATHEMATICS, SCIENCE AND TECHNICAL EDUCATION
23.15; Memo No 11 (Anat, Phys & Health): 23.18.11
25.16 (Memos Nos 13,14 & 15); 26.4 (Memos 16 & 17);
27.17* (pubs.); 28.10

SCOTTISH EDUCATION DEPARTMENT
Consultative Committee on the Curriculum – second report 1968/71: 19.17

SCOTTISH MATHEMATICAL COUNCIL
24.10

SECONDMENT OF CHEMISTS AND CHEMICAL ENGINEERS FROM INDUSTRY FOR TEACHER TRAINING:
Conference 21.9

SEYCHELLES
TVC: 19.22

SIERRA LEONE
TVC: 19.22
27.30

SINGAPORE
Colombo Plan Staff College for Technician Education: 19.30; 26.25

SIXTH FORM MATHEMATICS PROJECT
See: SCHOOLS COUNCIL PROJECTS –
READING UNIVERSITY VI FORM MATHS PROJECT

SIXTH FORM SCIENCE TOPICS
See: PUBLICATIONS ICI

SMP
See: SCHOOL MATHEMATICS PROJECT

SRI LANKA
Teachers' Vacation Course: 19.22

STANDING CONFERENCE ON SCHOOLS SCIENCE AND TECHNOLOGY (SCSST)
26.18

STIRLING UNIVERSITY
24.4.7

SURREY UNIVERSITY
24.4.8

SUSSEX UNIVERSITY
24.4.9

SWAZILAND
21.26
TVC: 19.22

TANZANIA
9th Symposium of E.African Academy: 19.26

TEACHER TRAINING COURSES – OVERSEAS
Vacation Courses (Education Seminars)
Gambia: 19.22
Guyana: 19.22
India: 19.22; 25.21

TEACHER TRAINING COURSE – OVERSEAS (Cont'd)
Indonesia: 19.22
Jamaica: 19.22
Kenya: 19.22
Lesotho: 19.22
Malaysia: 19.22
Malta: 19.22
Mauritius: 19.22
Montserrat: 19.22
Seychelles: 19.22
Sierra Leone: 19.22
Sri Lanka: 19.22

TEACHING AIDS
Maths (Osmiroid): 25.9

TEACHING PROBLEM SOLVING IN MATHEMATICS
20.21.6

TECHNICAL EDUCATION
Projects: 27.17

TECHNOLOGY IN SCHOOLS
20.26; 20.20.27; 25.13
See also: SCHOOLS COUNCIL PROJECTS
INTERMEDIATE TECHNOLOGY

TECHNOLOGY FOR TEACHERS
Open University Course: 25.13

THAILAND
Institute for the Promotion of Teaching Science and Technology: 19.27

UGANDA
22.18.3
Annual Chemical Society Conference: 19.28

USA
Center for Unified Science Education (CUSE): 21.27
National Science Teachers Association: (NSTA): 22.24

UNDERSTANDING
25.19.1 (Children's)

UNESCO
Pilot Projects –
Biology: 27.28 (Africa);* 28.22

UNIVERSITY DEPARTMENTS OF EDUCATION
MATHEMATICS STUDY GROUP (UDEMSG)
27.11

VOLUNTARY COMMITTEE ON OVERSEAS AID AND DEVELOPMENT (VCOAD)
24.22.17

WEST AFRICA
Project in Advanced Mathematics: 27.20

WEST AFRICAN ASSOCIATIONS OF SCIENCE TEACHERS (WAAST)
24.27

WEST AFRICAN EXAMINATIONS COUNCIL
27.20

YORK
27.7

ZAMBIA
23.25
Association for Science Education (ZASE): 23.25